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ABSTRACT

One can find enough evidence in the IS development (ISD) literature supporting the significance of method adaptation for the realization of an effective ISD. Method adaptation involves a decision making process through which the agent(s) modifies the project situation, including the method and the project context, at hand. This paper aims at exploring how a better delivery of guidance and advice (decision support) on method adaptation, i.e. the degree of which the decision support to be provided is employed successfully, can be achieved. To do this we study several stages in which a set of advice and guidance with some decision support tools on method adaptation realized in a large-scale IT department. Each stage is distinguished with respect to the underlying discourses proposed in the decision support literature and elaborated in terms of the method used, the involved parties concerning method adaptation, and the means used in a ten-year timeline in the department. This study shows that agility of the method used, the degree of sharedness of the meaning of method adaptation held by involved parties, the decision support approach (top-down, bottom-up, or middle-out approaches reflecting the degree of dominations of involved parties) to method adaptation, and the combination of human- and technology-driven guidance are essential to an appropriate delivery of decision support for method adaptation.

Keywords

Information systems development, method adaptation, decision support.

INTRODUCTION

It is evident that in practice methods are usually not used as prescribed (Baskerville & Stage, 2001). One of the reasons, sometimes called the one-size-fits-all issue, is that the model, embedded in a method and describing an ideal way of carrying out a project, does not fit uniqueness of the project situation, i.e. every project takes place in an emergent context and has unique features that cannot be determined in advance. Clearly, there is a need for method adaptation, i.e. the process of adapting the method to the project context at hand. We consider method adaptation as a decision-making process, which includes several compromises and trade offs between an adapted method and changes in a project situation. Thus, project managers need support for their decision-making process leading to an adapted method.

Different meanings of method adaptation, as we show later on, can be used and various ways and appropriateness of decision support are possible. For instance, method adaptation can be seen as a structured decision process and be fully automated using a tool. Such a tool may help an agent (e.g., a project manager, a method engineer) in determining well-defined fragments (e.g., prescribed templates, stages and activities, modeling approaches) for a given number of contextual factors (e.g., application characteristics, a degree of stability, clarity, complexity of business processes, rules, information need to be modeled) characterizing the project context at hand. Method adaptation incorporated with this tool may be used to assure high method compliance in a project. The provided decision support in this case might be used or rejected in the course of a system development project. To address this issue in this paper we use the term 'appropriate delivery of decision support' on method adaptation to refer to the degree of which the decision support to be provided is employed successfully by the agent. The goal of this study is to explore the essentials of a suitable delivery of decision support for method adaptation.

This paper adopts qualitative research approach and employs several knowledge elicitation techniques. This paper inductively draws lessons from the practice observed - rather than tests hypotheses defined in advance. In the next section we provide some information on background of the research, which includes: (i) a brief literature review on method adaptation in the IS literature, (ii) characterization of method adaptation in the context of the decision support literature, and (iii) the research approach adopted and the IT department we investigated. Then, we present three stages of decision support and discuss the essentials of a suitable delivery of decision support on method adaptation. In addition, we provide practical and theoretical implications of this study in the final section.

BACKGROUND OF THE RESEARCH

Several theoretical accounts and models have been proposed to illuminate the idea of method adaptation, but the decision support has stayed an implicit notion in these models. In the following we briefly explain the key constructs underlying existing models.

Different Perceptions on Method Adaptation in the ISD Literature

The term, *conventional methods*, is often used to refer to complex, rigid methods, which adopts one-size-fits approach in systems development. Recently, agile – denoting "having a quick resourceful and adaptable character" (Merrian-Webster, 2003) – ISDMs, agile methods in short, have appeared as a solution to the long-standing problems related to conventional methods.

Different terms and theoretical accounts have been used to study the notion of method adaptation. For example, 'method fragment adaptation' in (Baskerville and Stage, 2001), 'scenario use' in (Van Offenbeek & Koopman, 1996), 'method tailoring' in (Fitzgerald, Russo, and O'Kane, 2003), 'situational or situated method engineering' in (Harmsen, Brinkkemper, and Oei, 1994; Van Slooten, 1996), and 'context-specific method engineering' in (Rolland and Prakash, 1996).

The term adaptation simply implies 'a modification according to changing circumstances' (Merrian-Webster, 2003). Three constructs appear to be common notions in the existing models concerning method adaptation. The term *context* refers to a collection of relevant conditions and surrounding influences that make a project situation unique and comprehensible (Hasher and Zacks, 1984). A *method fragment* is a description of an ISDM, or any coherent part thereof. It is usually prescribed, and structured in terms of fragment properties (Harmsen at al., 1997). The *intention* is an indication of what drives the agents while carrying out method adaptation. Fragments can be principles, fundamental concepts, products to be delivered, activities needing to be performed, job aids - techniques, tools, hints, tips - to be used, etc. Three fundamental aspects of method are considered in this paper: its underlying philosophy (captured in a number of principles), its framework (stages, activities, products), and its essential techniques.

We elsewhere explain that existing studies related to method adaptation follow one of two key perspectives: the engineering perspective representing the positivist views of natural science, and the socio-organizational perspective representing interpretative views of social science (Aydin, 2004).

An Understanding of the Decision Making Process Embedded in Method Adaptation

The existing models concerning method adaptation in the IS literature do not explicitly mention the need for decision support for method adaptation. But, each model is nothing more than a model-based decision process in which an agent selects appropriate method fragments and configures them to reach an adapted method. So, we may consider method adaptation as a decision-making process. To understand the underlying discourses of decision support embedded in each model we use the 'five levels of representation of decision problems' model of (Humphreys, 1998). As stated in (Humphreys, 1998), 'five qualitatively different levels of constraint-setting may be identified, each associated with a different kind of discourse concerning how to structure the constraint at each level.' These levels are: (1) making best assessment, (2) exploring "what-if questions, (3) developing the structure of the problem within a frame, (4) use of "problem expressing discourse", (5) exploring "what needs to be thought about" within a "small world". Three views – *scientific management*, *the human relations school*, and *the structural approach* – on organizational decision making are backed by three legacies – *the need for the power to control*, *disciplinary power and the disciplined decision implementer*, and *experts, consultants, and fads enters the decision support area* (Humphreys, 1998). These three views and corresponding legacies reveal the discourses underpinning decision support. In this paper, we use the model and the discourses described in (Humphreys, 1998) to illuminate the existing models in IS literature proposed for method adaptation.

According to the models proposed by the engineering perspective, the fragments are predefined and the criteria for the selection derived from contextual factors are usually known. The decision process embedded in these models is concerned with 'how should people ideally make a decision on the relevant fragments?' These models basically focus on Level 3 and Level 1 and consider the rest of levels as taken for granted. Namely, for the agent 'small' world and the 'problem expressing discourse' is already determined with a frame in terms of a number of contextual factors. There is no any attempt to stimulate the agent to reflect on the context and the chosen fragment. So, the main interest behind these models is to making best assessments.

In attempt to overcome to limitations of the models proposed by the engineering school, the socio-organizational perspective is introduced (Baskerville & Stage, 2001). In comparison, the socio-organizational perspective takes into account level three, level four and level five, but excludes the other levels. The decision processes in the model proposed by this perspective is concerned with how and why decision makers actually make decisions in real project settings.

Recently, (Aydin, Harmsen, Slooten, & Stewgee, 2003) have pointed out a need for taking into account five levels in the context of method adaptation to determine appropriate decision support. They argue that (i) the context should be considered as emergent, but needs be framed by taking into account the agent's preference and dynamic relations between contextual factors, (ii) the fragments need to be distinguished as structured for prescribed fragments and as ill-structured for invented fragments, (iii) the intention that drives the behavior of the agent should be considered as a mediating construct between the contexts and the method fragments.

Research Approach and Context

This research was conducted in the form of a project in the organization and carried out by a research team consisting of people from both the university and the case organization. It includes three stages: the preliminary, actual, and the posterior study stages. During the actual research stage, one of the authors worked with a group of experts on tooling activities concerned with decision support for method adaptation. Another of the authors had been already involved in the development of decision support practices for more than two years. The other two authors were subject matter experts from the academic side. Further, a sponsor and an expert from the company participated in this research. In the actual research stage we use action research method, which is a qualitative research method. As (Avison et al., p.94 1999) state 'Action research is an iterative process involving researchers and practitioners acting together on a particular cycle of activities, including problem diagnosis, action intervention, and reflective learning'. Action research is primarily applicable for the understanding of what goes on in organizations. So, this research method appears to be in line with our research goal. One of the important aspects of the action research is that the researcher has usually dual interests: problem solving interest and research interest. For both purposes, as indicated by (Avison et al., 1999) a number of activities are performed in a linear or iterative manner.

The sources of information were, in this empirical setting, informants, direct observations, documents, and support tools or other artifacts concerning decision support for method adaptation. Since the information needed was partially available in the organization, the team concluded that several rounds of formal and informal interviews, direct observations in the form of attending meetings, and in-depth documentary analysis were the most appropriate ways to collect data. Some of the questions in the interviews in the preliminary and actual study stages are as follows. How do you go about using the method for a specific project? What do you look for and take into account when modifying the method for a specific project situation? How do you decide the appropriateness of each fragment? In the posterior study stage, the interviews included questions about one particular instrument which will be explained in the remainder of the paper. Some of these questions were: at which stage(s) of the project did you use the tool? Given this stage, how relevant was the tool? Was it easy to use, interesting to use? Was it easy to learn? Which module/part of the tool was the most interesting, useful, relevant to your needs? How helpful (effective) was it to carry out your task?

The organization we investigated is one of the leading financial institutions in Europe and operates in a dynamic business environment. One of the global strategic business units, Consumer & Commercial Clients (C&CC), focuses exclusively on services to individual clients and small- to medium-sized businesses. The Netherlands Business Unit (BU) is one of the five BUs under C&CC. IT Development is one of the departments within the Netherlands BU and employs 2000 people involved in systems development projects. Such a large IT department was chosen because it enabled us to investigate method adaptation across a ten-year timeline and we were asked to cooperate with them for this subject matter.

THE STAGES IDENTIFIED

Table 1 summarizes three stages and corresponding deliveries of decision support that have occurred in the last ten-year in the department. It is important to note that the researchers were actively involved and stayed on the department site in stage

II. For stage I, which took place ten years ago, we mainly did retrospective analysis. Finally, stage III takes place at the present time and is part of the posterior study stage.

	Stage I	Stage II	Stage III
Method used	Merger of two (in-housed and brand-named) conventional methods; Well-defined prescribed fragments	An agile method needs to be experienced with invented fragments	An agile method incorporates with evolving ISD practices
Involved parties and their understandings of method adaptation	Support officers focusing on risk management; Project managers with a passive role	Coaches as facilitators; Project managers with an active role; Researchers studying the feasibility of transferring the coaches' experience via an instrument	Coaches with a passive role; project managers with an active role for method adaptation
The means used	No formal procedure or tools specific to method adaptation; only the knowledge repository of structured fragments were available; risk management tools were promoted	Human-based support service as 'active first line' coaching; training and self-learning materials; several prototypes of an instrument	Human-based support service as 'active second line' coaching; an instrument in use

Table 1. Summary of Identified Stages Concerning the Delivery of Decision Support on Method Adaptation

Stage I

The organization's identity goes back ten years to the merger of two organizations, both of which were used to using conventional methods. An overwhelming number of fragments from two different method sources were around. Two methods needed to be merged and it took several years to reach a standard method. During this standardization, templates were adopted from the fragments of two methods and proposed as a 'cook book' method for all projects. Practitioners started to question about well-defined fragments and were reluctant to use them as prescribed. They commented that there were too many templates, procedures, and most of the sections in the templates were not relevant to their projects. Many attempts were made to help practitioners to use the fragments appropriately. A special role and organizational unit were created and furthermore a knowledge repository, containing all fragments and tools, was developed. One of the tools was supposed to be used for risk management in every project. The support officers were committed to gather feedback from the practitioners in the department and worked with project managers closely. The practitioners commented that the questions and the output o the tool were not relevant to their projects and the tool was not flexible to incorporate the feedback of project managers. Other attempts in providing support with some tools did not work out. Regarding method adaptation, there was not any formal or semi-formal procedure or support tool available, so the decision making concerned with method adaptation was done in ad hoc manner. Consequently, both the executives and practitioners were not happy about the situation at hand.

Stage II

Almost three years ago, the department decided to change method and adopted an agile method (Dynamic Systems Development Method - DSDM). The new method has become the method of choice for all ISD projects in the department. The main motivation for this decision was to ensure 'time-to-market' systems development, in order to achieve substantial product and process improvements, and to use one terminology in all projects. The method implementation in the department focused on coaching project managers in adopting the method at the department and project levels with the help of experts. So, the department established a temporary organizational unit consisting of a number of experts. The experts, known as coaches, had extensive project experience and were subject matter experts in the chosen method use.

They coached project managers on how to make better decisions on the suitability of DSDM and on the degree of adaptation the method would require for each project. Basically, there were two essential, important roles in DSDM adaptation: the project coaching role and the project management role. One can find the detailed description of coaching activities in (Aydin & Harmsen, 2002). The DSDM coaches assisted project managers in adapting DSDM to their project context, whereas project managers were fully responsible for the project execution. They were the final decision makers in terms of the use of

DSDM fragments. In two years, the coaches created their own coaching procedures, other decision support related artefacts and used them during the provision of the so-called first-line coaching support.

For characterization of a project the coach had used, the so-called Extended Suitability/Risk List (ESRL). The list contains a number of questions and refers to the critical success factors for the method, and the characteristics of projects that will make the method especially effective. During the early stages of the agile method use in the department, the coaches had used the questions in the original suitability filter available in the agile method user community (DSDM Consortium, 2003). Later, as they gained experience with them, some questions were extended and clarified, and furthermore, for each question, working instructions, measures, useful hints, and tips were added.

The ESRL became an instrument that provided a baseline for the written advice to be produced for each project. One can find the excerpt of the ESRL and its further explanation in (Aydin, 2004).

Consequently, the executives, the coaches and project managers in the department were satisfied with the on-going practices concerning method adaptation. But, due to a limitation on the resources available in the department knew that such an active coaching would be available for a certain time period and eventually the accumulated knowledge should have been transferred to project managers.

The department approached to the university for the feasibility of transferring accumulated knowledge, decision support related artefacts developed by coaches to the project managers. During the actual research stage the research team studied the existing decision support instruments, procedures, and other artefacts and observe coaches' interactions with project managers. The research team worked on the idea of self-coaching, i.e. the way through which project managers would coach themselves. The feasibility of this study was done in terms of business, operational, technical aspects. The team especially focused on the document-based version of the SRL and the way to use it in active coaching. Note that the instrument did not tell the coach what should be written in the advice; the coach used the questions as a reference for his advice.

The research team organized a workshop and invited a number of experts to capture, define and model the experts' knowledge. In fact, we tried to imitate coaches' way of thinking to formulate heuristics implicitly used in the process of method adaptation. This resulted a knowledge model and a number of heuristics that were agreed by the experts. We were trying to understand how the questions were used and being linked each other to reach a decision. At the end of the actual study stage, the research team discussed the details of research findings with the executives and provided a report. The report included implications of replacing the first-line coaching support with the idea of self-coaching, three versions of prototype, the feedback from the relevant parties, and suggestions for the use of prototype in future.

Stage III

After the actual research stage, the researchers had a passive role in the evolution of the instrument, but there was a continuing communication between the university and the department. As we already indicated that the first-line human-based decision support for project managers were only planned for a limited time period. During the posterior study the reactions of the coaches and executive managers were observed. The coaches organized several meetings and discussed the research findings of the actual study stage. They concluded that the prototype needed to be worked out and the instrument should be developed. The coach considered as an ambassador user in the prototype development became a volunteer for constructing an instrument. The instrument was developed in the same way as the prototype was constructed, i.e. using iterative development strategy. The detailed information about the content and construction of the instrument can be found in (Aydin, 2004).

It is found that general opinions of those project managers who used the instrument were very positive. In general, they commented that the instrument was interesting, easy to use, practical and relevant to the stages at which they used it. The statements and follow-up questions were perceived as, to some extent, clear, easy to understand, meaningful, comprehensive and relevant at particular time in the projects. They all commented that the questions required interpretations and for some statement project managers needed to understand meanings behind the statement and questions if they were not very relevant for their projects. So, in this way the characterization module helped them think more about their project situation. The measure module was found to be the most interesting and useful module. They all considered the generated measures as suggestions rather than taken for granted. In fact, they used the measures as means to justify or enhance their way of thinking for the use of countermeasures. The new or adapted measures were usually discussed and agreed with their business partners to determine appropriateness of measures.

The tool was perceived as relevant to their task concerning some other project leading activities such as project proposal preparation, workplan preparation. One of the project managers, who received first line coaching, commented, "The tool encourages and reminds the project manager to take the responsibility of assessing suitability of the method for their projects,

in the past coaches were doing this". Another commented, "The measures can act like referees in a discussion between project managers and other stakeholder". So, the tool was perceived as useful for the achievement of their task, their project leading skills, including, to some extent, better communication with business partners, attaining higher confidence in managing risks. Since the executives were happy with the result of the pilot use of the tool, they decided two things. First, the use of the tool in all projects in the department became mandatory. Second, the coaches would continue to provide off-line support for tool usage and utilize the feedback from the project managers and maintain the tool.

DISCUSSION AND CONCLUSIONS

Stage I is an example for typical top-down approach for method adaptation. Namely, the executives wanted a standard method to be used as 'a cook book', which reflects the 'one-size-fits-all' approach and considered project managers' role as a passive agent in decision making for method adaptation. The proposed decision support practices were aimed at level 1, simply indicates making best assessments out of well-defined fragments. In fact, the project managers in the department were supposed to implement the decision provided by human or technology agents. Legacy of the proposed solutions in this stage appeared to be in line with the need for the power to control the projects. In this situation the practitioners clearly opposed the discourse employed in several decision support practices provided. The understandings of method adaptation held by involved parties were not shared. In this stage, the degree of the appropriateness of the provided decision support for method adaptation was perceived as low.

Stage II is an example of typical bottom-up approach for method adaptation. Namely, the voice of practitioners in the department was dominant while choosing an agile method. Project managers were considered as an active component of decision process. The chosen method was a kind of reaction to 'one-size-fits-all' issue as faced in the previous method. The method in fact strongly emphasized the concepts of suitability and adaptability – the method would be, to a certain extent, suitable for a project or an organization, and was adaptable if not completely suitable. The chosen method was highly adaptable – it was possible to use fully-fledged the method, but individual techniques were still valuable on their own. Human decision support was perceived as an effective way to facilitate project managers in making better decisions about how best to use the method and its fragments. The experience gained during the first-line coaching support was collected, shared, and institutionalized. All levels of representation concerning method adaptation were of interest to the coaches, but they especially focused on level five (exploring "what needs to be thought about", level four (use of "problem expressing discourse", and level three (developing the structure of the problem within a frame). Note that the questions or contextual factors in the ESLR were used as a reference to point to frame the project context. The discourse underpinning the human decision support seems to the legacy of the human relations approach. In this case, the appropriateness of the provided decision support for method adaptation was high.

Stage III is in fact the realization of the plan, the idea of self-coaching, as discussed in stage II. So, it was a smooth transition from human-based decision support to instrument-based decision support in combination with the second-hand coaching support. In this stage, it was interesting to note that the practitioners have used the instrument to support different levels of representation of method adaptation. In fact, various roles can be attached the instrument in this stage. For many practitioners the instrument acted like a facilitator. For others, it was like an expert because it was based on human coaching support and its outcome was applicable to their project situation. Since the instrument in use was based on the continuation of stage II, the discourse underpinning this instrument appears to be again a combination of structured and the legacy of the human relations approach. Consequently, the degree of appropriateness of the provided decision support to the situation at hand was high and verified by the reactions of the practitioners in the department.

Concerning the transition from stage II to stage III we argue that a typical middle-out approach was deployed. Namely, while developing the idea of self-coaching, the needs, wishes and expectations of both executives and practitioners were taken into account. The researchers did not act like consultants and were careful about not to be seduced by two sides – the executives and practitioners. Incremental development with the prototyping technique was very useful to accommodate feedback of the parties, who were interested in and/or affected by the self-coaching. Of course, it was challenging to imitate the coaches' way of thinking, which was proved that it has been working in practice. It is important to note that the researchers were not bound to single perspective concerning method adaptation while studying the coaching practice. Rather, the researcher wanted to investigate decision-making phenomenon that took place in the department and used a multi-theoretic lens – combining the engineering and the socio-organizational perspectives. The discourse underpinning the prototype instrument and the suggested additional practice appears to be legacy of combination of structured approach and the human relations approach.

As three stages indicate, this study shows that agility of the method used, the degree of sharedness of the meaning of method adaptation held by involved parties, the appropriateness of approach (top-down, bottom-up, or middle-out reflecting dominations of involved parties) to method adaptation, and the combination of human- and technology-based means are

essential to a suitable delivery of decision support on method adaptation. For the understanding the degree of appropriateness of advice and guidance on method adaptation from standpoint of their successfulness we use general and typical traits for some scale of appropriateness (e.g., low, moderate, high). It is clear that in the first stage the degree of appropriateness was low and resulted in an undesired situation. The lessons learned from one stage have been used in the consecutive stages. So, these three stages can be considered as evolving decision support practices. This study also explicates the often-cited suggestion in the decision support literature that before providing tool-based decision support to practitioners we should first understand how the decision is made. Depending on the explicitness and complexity of discourses embedded in a decision-making process such an understanding would take quite few years.

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